ULTRAFAST DYNAMICS IN DNA AND RNA DERIVATIVES MONITORED BY BROADBAND TRANSIENT ABSORPTION SPECTRSCOPY

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The ultrafast dynamics of nucleic acids have been under scrutiny for the past couple of decades because of the role that the high-energy electronic states play in mutagenesis and carcinogenesis. Kinetic models have been proposed, based on both experimental and theoretical discoveries. Direct experimental evidence of the intersystem crossing rate and population of the triplet state for most nucleic acid bases has yet to be reported, even though the triplet state is thought to be the most reactive species. Utilizing broadband femtosecond transient absorption spectroscopy, we reveal the time scale at which singlet-to-triplet population transfer occurs in several nucleic acid derivatives in the condensed phase. The implication of these results to the current understanding of the DNA and RNA photochemistry will be discussed. The authors acknowledge the CAREER program of the National Science Foundation (Grant No. CHE-1255084) for financial support.